liteal DVT in 42 (48%), and superficial thrombophlebitis of the lower extremities in 84 (6.95%). In addition, deep venous insufficiency (>500 milliseconds) was found in 385 (31.87%) and superficial venous insufficiency in 212 (17.55%). A mass was found in 64 (5.3%), comprising 10 cysts, four hematomas, 46 solid masses, and three aneurysms.

Conclusions: Limited femoropopliteal ultrasound examination for acute DVT would have only detected a small percentage of the positive findings. These data suggest that the duplex examination can be used to further delineate the cause of outpatients' symptoms compared with the limited protocol.

After-Hours Vascular Testing: Results of the 2011 American Registry for Diagnostic Medical Sonography (ARDMS) Survey

Steven A. Leers, MD, RVT,[1] Rabih Chaer, MD, RVT,[1] R. Eugene Zierler, MD, RVT, RPVI[2]. [1]University of Pittsburgh Medical Center, Pittsburgh, Pa, and [2]University of Washington, Seattle, Wash; ARDMS

Objective(s): After-hours vascular laboratory testing remains controversial due to concerns regarding cost, sonographer job satisfaction, and clinical efficacy. To better understand these issues and current patterns of practice, the American Registry of Diagnostic Medical Sonographers (ARDMS) surveyed current registrants.

Methods: The on-line survey of 37 questions was administered from October 11, 2011, to November 21, 2011. Requests were sent to 9380 active ARDMS registrants, including 3735 vascular technology registrants (RVT) and 5645 general sonography registrants (RDMS).

Results: The overall response rate was 12% (1156 registrants). Women comprised 81% of respondents, 42% were aged >45 years, and 54% had >10 years of experience in vascular testing. Most respondents (85%) were full-time employees and 83% were located in a hospital laboratory. The RVT credential was held by 76%, and the RDMS creditial by 85%. Only 39% of facilities had a dedicated vascular laboratory. After-hours vascular testing was performed by 66%. Positive result rates of <25% were reported by 85% of sonographers for all studies. Only 45% of facilities had a specific protocol for after-hours testing, and only 19% of facilities required screening before a study could be ordered. When a screening policy was in effect, this resulted in a decreased testing volume in 49%. Thirty-nine percent of respondents felt after-hours examinations were rarely indicated, 75% felt that after-hour call requirements negatively affected job satisfaction, and 65% reported that call requirements would have a significant effect on their decision to accept a new position. In response to questions regarding whether emergency department physicians should be instructed in the performance of venous compression ultrasound, responses were mixed: 36% agreed but 41% disagreed.

Conclusions: Practice patterns regarding after-hours vascular laboratory testing remain widely variable. Most such testing is performed by credentialed sonographers in radiology departments of hospitals without a dedicated vascular laboratory. The requirement for on-call availability affects sonographer job satisfaction and recruitment. Interest in teaching point-of-service examinations to emergency department physicians is mixed. A screening policy can decrease the numbers of after-hours tests. Development of specific protocols and policies could improve the utilization of after-hours vascular testing.

McCleery's Syndrome: Incidence, Etiology, and Treatment in 2011

Kendall C. Likes, Danielle Rochlin, Julie A. Freischlag, MD. Johns Hopkins Medical Institution, Baltimore, Md

Objective(s): Patients presenting with a chief complaint of swelling of the upper extremity without thrombosis, otherwise known as McCleery's syndrome, have intermittent compression of the subclavian vein. The purpose of this study was to determine outcomes in patients undergoing first rib resection and scalenectomy (FRRS) presenting with McCleery's syndrome.

Methods: A prospectively maintained database from 2003 to 2011 was used to retrospectively review patients for presentation, diagnosis, treatment, and clinical outcomes.

Results: Of patients presenting with venous thoracic outlet syndrome, 19 (11%), comprising 13 females and 6 males, who were a mean age of 26 years (range, 10-44 years), presented with intermittent arm swelling. Three of these patients were identified as having chronic thrombus that was not previously treated surgically. One patient presented with bilateral symptoms. All patients reported significant symptoms of swelling, pain, and discomfort when performing tasks that required chronic and repetitive use of the upper extremity. All patients were diagnosed based on a detailed history and physical; however, only 10 showed significant compression of the subclavian vein on abduction as seen by duplex scan. In our vascular laboratory, significant compression of the subclavian vein demonstrated complete cessation of flow. A total of 20 FRRS operations were performed. Four patients (20%) had a pneumothorax, and none had nerve injury or bleeding. One patient had subclavian vein thrombosis postoperatively and did well after thrombolysis and balloon dilatation. Of the 16 patients (17 FRRS) with intermittent compression alone, four underwent venograms 2 weeks postoperatiely, and one required dilation. Two had venography 1 year postoperatively due to persistent symptoms, and one required dilation. The remaining patients were followed up clinically (four) or with duplex scan (five), without any symptomatic complaints. One patient was lost to follow-up. Of those with chronic thrombus, two had venograms 2 weeks postoperatively and were patent, and one required venography and dilatation 1 year postoperatively due to persistent symptoms.

Conclusions: In patients presenting with McCleery's syndrome, FRRS was effective in relieving symptoms in 13 of 15 (87%). These patients do not generally need a postoperative venogram unless they experience continuing symptoms, due to the low incidence of venous stenosis found by venography. In patients with chronic thrombus as an etiology to their intermittent compression, routine postoperative venography at 2 weeks is indicated. Patients can present with intermittent compression if an acute episode of subclavian vein thrombosis is not aggressively treated.

Endovascular Recanalization of Complete Chronic Inferior Vena Cava Filter Thrombosis

Andrew J. Meltzer, MD, Nii Kabu Kabutey, MD, Peter H. Connolly, MD, John K. Karwowski, MD, Doug Jones, MD, Darren B. Schneider, MD. Weill Cornell Medical College, New York Presbyterian Hospital, New York, NY

Objective(s): Inferior vena cava (IVC) filter (IVCF) placement is associated with increased risk of deep vein thrombosis. This may result from filter obstruction by trapped emboli or in situ thrombosis of the IVCF, followed by caval thrombus propagation. Here, we decribe a technique and early results of stent-assisted endovascular recanalization of chronically occluded IVCF.

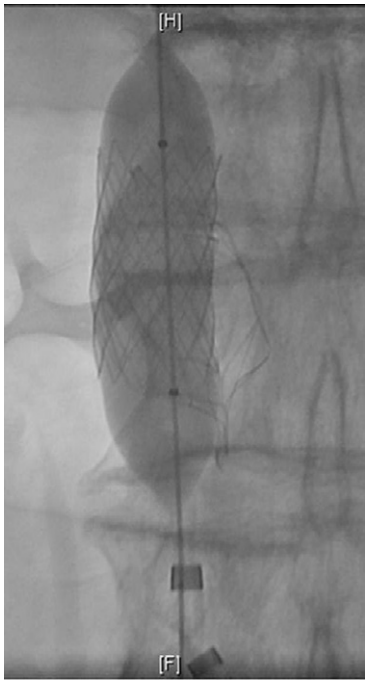

Fig.

Methods: This prospective study (2011 to 2012) included patients with chronic IVCF obstructions involving the IVCF itself, the IVC, and extending to the bilateral iliofemoral venous systems. Intravascular ultrasound imaging and venography was performed in all patients and confirmed complete occlusion. Via bilateral femoral vein access, the occluded iliofemoral veins, IVC, and IVCF were crossed using standard technique. Venography confirmed lumenal position and caval patency above the occluded IVCF. After predilation to permit treatment, caval filters were remodeled using high-pressure angioplasty and a combination of self-

expanding and balloon-mounted stents. A representative balloon-mounted stent-assisted remodeling of an occluded Optease (Cordis, Inc) IVCF placed 3 years before is shown in the Fig. Self-expanding stents were deployed distally from the IVCF site to treat the entire obstructed segment. Technical success, clinical outcome, and duplex ultrasound assessment are reported throughout follow-up. Patients were maintained on chronic anticoagulation therapy.

Results: Five patients (average age, 68; range, 60-77 years) had long-standing IVCF (average duration, 6.25 years; range, 3-10 years) and debilitating venous outflow obstruction with ulceration or venous claudication despite conservative management. Immediate technical success was achieved in all patients. There was no perioperative morbidity. All patients noted marked clinical improvement and duplex documentation of stent patency to date (average, 4.25 months; range, 1-7 months).

Conclusions: Endovascular recananalization of chronically occluded IVCFs is technically feasible. Early results suggest the safety and efficacy of this approach to complex, iatrogenic venous outflow obstruction caused by chronic IVCF occlusion.

The HeRO Experience: Midterm Report on a Difficult Dialysis Population

Justin Wallace, MD,[1] Rabih Chaer, MD,[2] Ellen D. Dillavou, MD[2]. [1]University of Pittsburgh Medical Center and [2]University of Pittsburgh, Pittsburgh, Pa

Objective(s): The Hemodialysis Reliable Outflow (HeRO) catheter has provided an innovative means to obtain hemodialysis access for patients with severe central venous occlusive disease. The outcomes of this novel treatment modality in a difficult population have yet to be clearly established.

Methods: A retrospective review of HeRO catheter placement from June 2010 to present was performed. Patient hemodialysis access history, clinical complexity, complications, and outcomes were analyzed.

Results: HeRO catheter placement was attempted 21 times in 19 patients (52% female), with an 86% success rate (three unsuccessful attempts). All but one was placed in the upper extremity. Mean follow-up after placement has been 6.8 ± 5.5 months (range, 0.0-17.5 months). The primary indication for all HeRO catheter placements was central vein occlusion(s) and need for arteriovenous access. Patients averaged 2.0 previous (failed) accesses and multiple catheters. Seven patients had significant arterial issues in one or both upper extremities. Four HeRO catheters (23.5%), all in women, required ligation and removal for severe steal symptoms in the immediate postoperative period ($P = .01$ vs men). Two deaths not thought to be related to HeRO occurred in the postoperative period. Three HeROs were placed above fistulas for rescue. All thrombosed ≤4 months, although fistulas remained open. Average time to initial failure, including thrombosis or explantation due to steal or infection, was 4.6 ± 4.5 months (range, 0-14.2 months). Of 12 HeROs that functioned >30 days, average functional time has been 9 months. Two HeROs were removed for infection at 3.5 and 7.5 months after placement. Secondary patency was maintained in four patients for a mean duration of 10.4 ± 4.9 months (range, 6.4-17.5 months), with an average of 4.0 ± 2.2 thrombectomies (range, 1-6 months) per catheter.

Conclusions: HeRO catheter placement, when used as a last-resort measure, has been able to provide upper extremity access in patients who otherwise would not have this option. There is a high complication rate, however, including a very high incidence of steal in women. HeRO catheters should continue to be used as a last resort.

How Often Is Inflow Stenosis a Contributing Factor in the Etiology of Arteriovenous Access-Induced Ischemic Steal?

Angela A. Kokkosis, MD, Steven Abramowitz, MD, Jonathan Schwitzer, BS, Scott Nowakowski, MD, Victoria J. Teodorescu, MD, Harry Schanzer, MD. Mount Sinai Medical Center, New York, NY

Objective(s): To determine how frequent inflow stenosis is a contributing factor in the etiology of arteriovenous access-induced steal (AVAIS).

Methods: Between October 2001 and December 2011, 17 patients (47% men) with severe AVAIS (Rutherford stage 2-3) were evaluated in our center with complete vascular imaging (aortic arch plus upper extremity imaging). Patient demographics, access history, time to steal symptoms, preoperative angiographic imaging, and interventions performed were analyzed. Hemodynamically significant stenosis was defined as >50% reduction in the diameter of the vessel lumen.

Results: The 17 patients were an average age of 61.9 ± 10.4 years, and 47.1% were African Americans. The average time to presentation of steal symptoms was 158 ± 246 days. All accesses were placed were in the proximal arm, and 65.7% were with native vein. Imaging studies consisted of angiography in 14 patients and computed tomography angiography in three. Five of the 17 patients (29.4%) had imaging evidence of significant inflow stenosis. The location of stenosis was the subclavian artery in three and the brachial artery in two. The interventions subsequently performed were distal revascularization and interval ligation in 12, ligation in three, and angioplasty and stenting in two.

Conclusions: Hemodynamically significant inflow stenosis contributing to AVAIS is a very prevalent etiologic factor that should not be ignored. Preoperative angiography should be an important step in the evaluation and treatment of this condition. Endovascular treatment by itself may not be curative for patients with steal, but the correction of the inflow stenosis is important as an adjunct for any other of the corrective measures.

Outcomes of Arteriovenous Fistula Creation by Location: Does Gender Matter?

Steven D. Abramowitz, MD, Jonathan Schwitzer, BS, Victoria Teodorescu, MD, Angela Kokkosis, MD, Harry Schanzer, MD, Peter Faries, MD, Ageliki Vouyouka, MD. Mount Sinai Hospital, New York, NY

Objective(s): Prior work suggests that fistula failure is more likely in women; however, this work has not stratified outcomes by fistula location. This study seeks to compare the outcomes of men and women with suitable vessel diameters on preoperative ultrasound mapping after creation of radiocephalic (RCF), brachiocephalic (BCF) and brachiobasilic arteriovenous fistulas (BBF).

Methods: This retrospective study evaluated 580 patients aged <70 years with regular follow-up after creation of arteriovenous fistula. Within this group, 188 (73 women and 115 men) underwent RCF creation, 233 (113 women and 120 men) underwent BCF creation, and 159 (77 women and 82 men) underwent BBF creation. Medical records were analyzed for preoperative ultrasound results, fistula patency, central venous catheter days, and fistula-related procedures.

Results: The difference in vein diameter among men and women in the RCF, BCF, and BBF access cohorts was not statistically significant. Sex did not influence the site of access creation ($P = .72$). Primary functional and cumulative (primary assisted and secondary) patency of RCFs at 1 year for women and men was 32% vs 51% ($P = .02$) and 64% vs 77% ($P = .03$), respectively. Women vs men had a greater number of catheter days (88 vs 58, $P = .01$) and more fistula-related procedures (1.4 vs 0.8, $P = .01$). Primary functional and cumulative patency for BCFs at 1 year for women and men was 44% vs 58% ($P = .04$) and 72% vs 85% ($P = .03$), respectively. Women vs men had a greater number of catheter days (74 vs 61, $P = .05$) and more fistula-related procedures (1.6 vs 0.7, $P = .04$). Primary functional and cumulative patency at 1 year for BBFs in women and men was 61% vs 68% ($P = .51$) and 78% vs 87% ($P = .21$), respectively. Women had no difference in the number of catheter days ($P = .38$) or fistula-related procedures ($P = .52$).

Conclusions: These data suggest it is possible to achieve functional arteriovenous fistula in women regardless of fistula location. However, there exist statistically significant differences in fistula-related outcomes between men and women undergoing creation of RCFs or BCFs. There appears to be no difference in sex-related outcomes for BBFs.

Readmission Rates of Tunneled Dialysis Catheters Compared to Permanent Arteriovenous Access

Sam Tyagi, Arthur Yushuva, Shinichi Fukuhara, David Lucido, Erez Dayan, Stephen Haveson. Beth Israel Medical Center, New York, NY

Objective(s): The current methodology in treating patients with end-stage renal disease (ESRD) includes dialysis via arteriovenous fistulas (AVF), arteriovenous grafts (AVG), and tunneled dialysis catheters (TDCs). The standard treatment is to obtain permanent hemodialysis access (AVF and AVG) during that admission. TDCs can be placed quickly for emergency dialysis, but hospital stays are sometimes lengthened to place permanent access as an inpatient. Current practice may increase hospital length of stay, cost, and associated nosocomial comorbidities. We propose that permanent access placement in every patient presenting with ESRD on initial admission is not necessary. The TDC should be placed and the permanent access created as an elective, outpatient operation. We were interested in comparing outpatients dialyzed via permanent access with patients dialyzed with TDCs to assess whether it is safe and cost-effective to discharge a patient with a TDC. Our objective was to observe the readmission rates, reasons for readmission, and problems in the two groups associated with access.